PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

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NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)

(PCT Rule 44bis.1(c))

To:

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Blakely, Sokoloff, Taylor & Zafman LLP
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Los Angeles, CA 90025
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NO DOCKETING REQUIRED
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| Date of mailing *(day/month/year)* | |
| 22 December 2005 (22.12.2005) | |

| Applicant's or agent's file reference | |
| 6518.P002PCT | **IMPORTANT NOTICE** |

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2004/017845	04 June 2004 (04.06.2004)	06 June 2003 (06.06.2003)

| Applicant | |
| | INTELLAMBDA SYSTEM, INC. et al |

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Yoshiko Kuwahara
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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 6518.P002PCT	FOR FURTHER ACTION	See item 4 below
International application No. PCT/US2004/017845	International filing date *(day/month/year)* 04 June 2004 (04.06.2004)	Priority date *(day/month/year)* 06 June 2003 (06.06.2003)]
International Patent Classification (IPC) or national classification and IPC [7] H04J 14/00		
Applicant INTELLAMBDA SYSTEM, INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 13 sheets, including this cover sheet.

    In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

    ☒ Box No. I   Basis of the report

    ☐ Box No. II   Priority

    ☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

    ☐ Box No. IV   Lack of unity of invention

    ☒ Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

    ☐ Box No. VI   Certain documents cited

    ☐ Box No. VII   Certain defects in the international application

    ☐ Box No. VIII   Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis*.2).

	Date of issuance of this report 08 December 2005 (08.12.2005)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Yoshiko Kuwahara
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Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
LESTER J. VINCENT
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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing (day/month/year)	**18 JAN 2005**

Applicant's or agent's file reference	FOR FURTHER ACTION
6518.P002PCT	See paragraph 2 below

International application No.	International filing date (day/month/year)	Priority date (day/month/year)
PCT/US04/17845	04 June 2004 (04.06.2004)	06 June 2003 (06.06.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): H04J 14/00 and US CL: 398/49

Applicant

INTELLAMBDA SYSTEMS, INC.

1. This opinion contains indications relating to the following items:

☒ Box No. I   Basis of the opinion

☐ Box No. II   Priority

☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

☐ Box No. IV   Lack of unity of invention

☒ Box No. V   Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI   Certain documents cited

☐ Box No. VII   Certain defects in the international application

☐ Box No. VIII   Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US	Authorized officer
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Jason Chan Telephone No. 571 272-2600

Form PCT/ISA/237 (cover sheet) (January 2004)

Box No. I   Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐   This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

    a.   type of material

        ☐   a sequence listing

        ☐   table(s) related to the sequence listing

    b.   format of material

        ☐   in written format

        ☐   in computer readable form

    c.   time of filing/furnishing

        ☐   contained in international application as filed.

        ☐   filed together with the international application in computer readable form.

        ☐   furnished subsequently to this Authority for the purposes of search.

3. ☐   In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	Please See Continuation Sheet	YES
	Claims	Please See Continuation Sheet	NO
Inventive step (IS)	Claims	Please See Continuation Sheet	YES
	Claims	Please See Continuation Sheet	NO
Industrial applicability (IA)	Claims	Please See Continuation Sheet	YES
	Claims	Please See Continuation Sheet	NO

2. Citations and explanations:

Please See Continuation Sheet

Claims 191, 196-219 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the claimed subject matter.

Claims 1-219 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

V.1. Reasoned Statements:
The opinion as to Novelty was positive (Yes)with respect to claims 4-29,32,34-45,48-51,53-103,108-136,140,142-143,145,151,157-159,161,219
The opinion as to Novelty was negative (No) with respect to claims 1-3,30-31,33,46-47,52,104-107,137-139,141,144,146-150,152-156,160
The opinion as to Inventive Step was positive (Yes)with respect to claims 191,196-219
The opinion as to Inventive Step was negative(NO) with respect to claims 1-190,192-195
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-219
The opinion as to Industrial Applicability was negative(NO) with respect to claims NONE

V. 2. Citations and Explanations:
Claims 1-3 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Regarding claim 1, Jukan et al. teaches in page 827, right col., second paragraph multi-contraint, QoS-routing based on the availability of a local (distributed) rather than global network state information. Regarding claim 2, Jukan teaches QoS as a constraint and teaches. Jukan suggests to use DWP-R with wavelength shifting and DWP without wavelength shifting. Regarding claim 3, Jukan et al. teaches in page 827, right col., last 2 lines locally maintained network state information (i.e., local topology database).

Claim 4 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Jukan et al. has been discussed above in regard to claims 1-3. Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claim 5 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Jukan et al. (A. Jukan et al., "Service-Specific Wavelength Allocation in QoS-Routed Optical Networks", IEEE 1998). Jukan (2002) has been discussed above in regard to claims 1-3. Jukan (1998) further teaches in page 2272, left col. to allocate wavelengths to services. This separates the network into separate service levels.

Claim 6 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Jukan (2002) and Jukan (1998) have been discussed above. The difference between Juakn (2002) and Jukan (1998) and the claimed invention is that Juakn (2002) and Jukan (1998) do not teach architecture of the database. However, database systems are well known in the art. For example, Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to provide separate topology structure for each service level for each access node.

Claims 7-9 and 12-16 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Illikkal et al. (U.S. Patent Application Pub. 2003/0090995 A1). Jukan et al. has been discussed above in regard to claims 1-3. The difference between Jukan et al. and the claimed invention is that Jukan et al. does not teach sending connectivity request messages. Illikkal et al. suggests in paragraph [0035] to use RSVP signaling protocol to establish light by reserving path link-by-link from end-to-end. Regarding claims 8 and 12, Jukan teaches QoS as a constraint. Jukan suggests to use DWP-R with wavelength shifting and DWP

Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

without wavelength shifting. Regarding claim 9, Jukan et al. teaches in page 827, right col., last 2 lines locally maintained network state information (i.e., local topology database). Regarding claim 14, it is well known that acknowledgement is sent back to the originating node in RSVP protocol.

Claims 10 and 17 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Jukan et al. and Illikkal et al. have been discussed above in regard to claims 7-9 and 12-16. Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claims 11 and 18 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 7-9 and 12-16 and further in view of Jukan et al. (A. Jukan et al., "Service-Specific Wavelength Allocation in QoS-Routed Optical Networks", IEEE 1998). Jukan (2002) and Illikkal et al. have been discussed above in regard to claims 7-9 and 12-16. Jukan (1998) further teaches in page 2272, left col. to allocate wavelengths to services. This separates the network into separate service levels.

Claims 19 and 20 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 7-9 and 12-16 and further in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). Jukan et al. and Illikkal et al. have been discussed above in regard to claims 7-9 and 12-16. RFC-2205 further teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claims 21-25 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. and Illikkal et al. as applied in the preceding paragraph with regard to claims 7-9 and 12-16 and further in view of RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998). Jukan et al. and Illikkal et al. have been discussed above in regard to claims 7-9 and 12-16. RFC-2328 further teaches in Section 12.2 link state database. It is well known in the art to store link state in databases for distributed network topology construction. Regarding claim 22, Jukan teaches QoS as a constraint. Regarding claim 23, Illikkal et al. suggests in paragraph [0035] to use RSVP signaling protocol to establish light by reserving path link-by-link from end-to-end. It is well known that acknowledgement is sent back to the originating node in RSVP protocol. Regarding claims 24-25, a positive or negative acknowledgement of RSVP is used to update topology database.

Claim 26 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 21-25 and further in view of Jukan et al. (A. Jukan et al., "Service-Specific Wavelength Allocation in QoS-Routed Optical Networks", IEEE 1998). Jukan (1998) further teaches in page 2272, left col. to allocate wavelengths to services. This separates the network into separate service levels.

Claim 27 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claim 26 and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Database systems are well known in the art. For example, Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to store connectivity in a database for providing service level topology structure for each service level.

Claims 28-29 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 21-25 and further in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). RFC-2205 teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claims 30-31 and 33 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set.

Claims 32 and 34 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). Jukan et al. has been discussed above in regard to claims 30-31 and 33. Regarding claim 32, the difference between Jukan et al. and the claimed invention is that Jukan et al. does not teach to transmit error message back to a source node. RFC-2205 teaches in page 6

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In case the space in any of the preceding boxes is not sufficient.

that in failure conditions, RSVP program returns an error notification to the application process that originated the request. Regarding claim 34, RFC-2205 further teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claims 35-37 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Golmie teaches in FIG. 3 to use different wavelengths for different service levels. Regarding claims 36-37, it is obvious that path channel set and link channel set include only wavelengths that quality for a particular service level specified in a service request.

Claims 38-39 and 41 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set. It is obvious to convert the method of Jukan et al. into a computer program and store the program in a machine-readable medium such as tape or disk.

Claims 40 and 42 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). Jukan et al. has been discussed above in regard to claims 30-31. Regarding claim 32, the difference between Jukan et al. and the claimed invention is that Jukan et al. does not teach to transmit error message back to a source node. RFC-2205 teaches in page 6 that in failure conditions, RSVP program returns an error notification to the application process that originated the request. Regarding claim 34, RFC-2205 further teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claims 43-45 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. has been discussed in regard to claims 38-39 and 41. Golmie teaches in FIG. 3 to use different wavelengths for different service levels. Regarding claims 44-45, it is obvious that path channel set and link channel set include only wavelengths that quality for a particular service level specified in a service request.

Claims 46-47 and 52 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Regarding claim 46, Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. Regarding claim 47, Jukan et al. teaches service-specific vector of routing constraints. Regarding claim 52, Jukan et al. teaches in step 3 of DWP to obtain set of all feasible paths and in step 4 acknowledgement for indicating path complete.

Claims 48-50 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Jukan et al. (A. Jukan et al., "Service-Specific Wavelength Allocation in QoS-Routed Optical Networks", IEEE 1998). Jukan (2002) has been discussed above in regard to claims 46-47. Jukan (1998) further teaches in page 2272, left col. to allocate wavelengths to services. This separates the network into separate service levels.

Claim 51 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). Jukan et al. has been discussed above in regard to claims 46-47. RFC-2205 further teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claim 53 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. has been discussed in regard to claims 46-47 and 52. Golmie teaches in FIG. 3 to use different wavelengths for different service levels.

Claims 54-55 and 60 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-

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In case the space in any of the preceding boxes is not sufficient.

based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Regarding claim 54, Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. It is obvious to convert the method of Jukan et al. into a computer program and store the program in a machine-readable medium such as tape or disk. Regarding claim 55, Jukan et al. teaches to include QoS as a constraint. Regarding claim 60, Jukan et al. teaches in step 3 of DWP to obtain set of all feasible paths and in step 4 acknowledgement for indicating path complete.

Claims 56-57 and 61 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. has been discussed in regard to claims 54-55. Golmie teaches in FIG. 3 to use different wavelengths for different service levels.

Claim 58 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Jukan et al. and Golmie et al. have been discussed above. The difference between Juakn et al. and Golmie et al. and the claimed invention is that Juakn et al. and Golmie et al. do not teach architecture of the database. However, database systems are well known in the art. For example, Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to provide separate topology structure for each service level for each access node.

Claim 59 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of RFC-2205 (Braden et al., RFC-2205, "Resource Reservation Protocol (RSVP) - Version 1 Functional Specification", IETF, September 1997). Jukan et al. has been discussed above in regard to claims 54-55. RFC-2205 further teaches in Section 3.1 RSVP message formats. In particular, RFC-2205 includes RSVP_HOP (see page 34) and SENDER_TEMPLATE (see page 35). An RSVP session is defined in page 7 as a triple (DestAddress, ProtocolId, DstPort) which is equivalent to a request ID.

Claims 62-67 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Jukan et al. suggests to use QoS as constraint. Golmie further teaches in Table 1 services classification based on BER, survivability, etc. Regarding claim 65, Jukan et al. teaches to use DWP to determine topology with specific service level. Regarding claims 66-67, Jukan et al. discusses in p. 832, left col. wavelength shifting. Jukan et al. suggests in p. 832, right col. to use electronically regenerative network element for wavelength shifting.

Claims 68-69 and 73 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP) and in p. 832, left col. wavelength shifting. Jukan et al. suggests to use QoS as constraint. Golmie further teaches in Table 1 services classification based on BER, survivability, etc.

Claims 70-72 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1). Jukan et al. and Golmie et al. have been discussed above in regard to claims 68-69 and 73. Regarding claim 70, Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly. Regarding claims 71-72, it is obvious to monitor metrics, as taught by Okajima et al., and compare metrics with table 1 of Golmie et al. for classifying a link.

Claim 74 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 68-69 and 73 and further in view of Rychlicki (U.S. Patent Application Pub. 2003/0020982 A1). Jukan et al. and Golmie et al. have been discussed above in regard to claims 68-69 and 73. Rychlicki further teaches in paragraph [0025] to select path with least number of wavelength conversions

Claim 75 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Golmie teaches in Table 1 services classification based on BER, survivability, etc.

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In case the space in any of the preceding boxes is not sufficient.

Claim 76 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Zhang et al. (U.S. Patent Application Pub. 2003/0035166 A1). Zhang et al. teaches in paragraph [0053] lightpath without wavelength conversion.

Claim 77 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claim 78 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 76 and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to provide separate topology structure for each service level for each access node.

Claims 79-81 and 84 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Golmie teaches in Table 1 services classification based on BER, survivability, etc. Regarding claim 81, Jukan et al. teaches in page 827, right col., last 2 lines locally maintained network state information (i.e., local topology database). Regarding claim 84, Jukan et al. teaches that a path exists only if the intersection of the link service level wavelength for all links is not null.

Claim 82 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claim 83 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 79-81 and 84 and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to provide separate topology structure for each service level for each access node.

Claims 85-91 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) and RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998, pp. 121-122). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Golmie teaches in Table 1 services classification based on BER, survivability, etc. RFC-2328 teaches in Section 12.2 link state database. It is well known in the art to store link state in databases for distributed network topology construction. Regarding claim 91, since each lightpath is associated with a paticular service level, changing service level implies changing lightpath.

Claims 92-93 and 96-97 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Golmie teaches in Table 1 services classification based on BER, survivability, etc.

Claims 94-95 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1). Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly. Regarding claim 95, it is obvious to monitor metrics, as taught by Okajima et al., and compare metrics with table 1 of Golmie et al. for classifying a link.

Claims 98-99 and 102-103 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine,

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February 2000). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Golmie teaches in Table 1 services classification based on BER, survivability, etc. It is obvious to convert the method of Jukan et al. into a computer program and store the program in a machine-readable medium such as tape or disk.

Claims 100-101 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1). Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly. Regarding claim 101, it is obvious to monitor metrics, as taught by Okajima et al., and compare metrics with table 1 of Golmie et al. for classifying a link.

Claims 104-107 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set. Regarding claim 107, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time.

Claims 108-110 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Jukan et al. has been discussed above in regard to claims 104-107. Date further teaches database design. It is obvious to store various parameters of an object in a database.

Claims 111-114 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set. It is obvious to convert the method of Jukan et al. into a computer program and store the program in a machine-readable medium such as tape or disk. Regarding claim 114, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time.

Claims 115-117 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Jukan et al. has been discussed above in regard to claims 111-113. Date further teaches database design. It is obvious to store various parameters of an object in a database.

Claims 118-121 and 124 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Melaku et al. (U.S. Patent Application Pub. 2003/0074443 A1). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set. Melaku et al. teaches in paragraph [0056] that if a user decides to change QoS requirements in the midst of a session, new resources are to be reallocated and a new path that meets the requested QoS is established. Regarding claim 121, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time.

Claims 122-123 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Date further teaches database design. It is obvious to store various parameters of an object in a database.

Claims 125-128 and 131 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Melaku et al. (U.S. Patent Application Pub. 2003/0074443 A1). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. The path information message includes initial path sequence and path channel (Λsws). Jukan et al. teaches in p. 832 first paragraph to form intersection of path channel and link channel set. Melaku et al. teaches in paragraph [0056] that if a user decides to change QoS requirements in the midst of a session, new resources are to be reallocated and a new path that meets the requested QoS is established. It is obvious to convert the modified method of Jukan et al. and Melaku et al. into a computer program and store the program in a machine-readable medium such as tape or disk. Regarding claim 128, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time.

Claims 129-130 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-

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41). Date further teaches database design. It is obvious to store various parameters of an object in a database.

Claims 132 and 134-136 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. Date further teaches database design. It is obvious to store various parameters of an object in a database. Regarding claim 136, it is well known in the art that all paths from a single source node to others nodes in a network form a tree with the source node as the root. Regarding claim 135, it is well known in the art that a graph can be represented by a matrix which is a table. Since a tree is a graph, it can be represented by a table.

Claim 133 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Chaudhuri et al. (U.S. Patent Application Pub. 2002/0030864 A1). Judan et al. and Date have been discussed above in regard to claim 132. Chaudhuri et al. further teaches in paragraphs [0125] to [0134] to include optical physical layer parameters in link state structure. This includes available wavelengths for each link.

Claims 137-139, 141 and 144 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. Regarding claim 141, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time. Regarding claim 144, Jukan et al. teaches in page 827, right col., last 2 lines locally maintained network state information (i.e., local topology database).

Claim 140 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Zhang et al. (U.S. Patent Application Pub. 2003/0035166 A1). Zhang et al. teaches in paragraph [0053] lightpath without wavelength conversion.

Claim 142 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000). Golmie teaches in Table 1 services classification based on BER, survivability, etc.

Claim 143 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Date teaches in Chapter 2 architecture of a database system. In particular, Date teaches in FIG. 2.3 separate storage structure and separate external user views. Thus it is obvious to provide separate topology structure for each service level for each access node.

Claim 145 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Solheim et al. teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claims 146-150 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. Regarding claims 148-149, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set. Regarding claim 150, Jukan et al. teaches in p. 828, right col., Definition 2 local network state information.

Claim 151 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Solheim et al. teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claims 152-156 and 160 lack novelty under PCT Article 33(2) as being anticipated by Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. Regarding claim 155, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time. Regarding claim 156, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set.

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Claim 157 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1). Jukan et al. has been discussed in regard to claims 152-156 and 160. Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly.

Claim 158 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Chaudhuri et al. (U.S. Patent Application Pub. 2002/0030864 A1). Jukan et al. has been discussed in regard to claims 152-156 and 160. Chaudhuri et al. further teaches in paragraph [0125] to [0134] to include optical physical layer parameters in link state structure and use network layer protocol such as OSPF to propagate link state information to other nodes in the network.

Claim 159 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Jukan et al. has been discussed in regard to claims 152-156 and 160. Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claim 161-163 lacks an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength path (DWP) where a path information message is passed along a potential path. RFC-2328 further teaches in Section 12.2 link state database. It is well known in the art to store link state in databases for distributed network topology construction. Regarding claim 162, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time. Regarding claim 163, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set.

Claim 164 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Date ("An Introduction to Database Systems" by C. Date, Addison-Wesley, 1986, pp. 29-41). Date teaches in Chapter 2 architecture of a database system. Thus it is obvious to provide to include additional modules to build and maintain a database.

Claim 165 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 161-163 and further in view of Solheim et al. (U.S. Patent Application Pub. 2003/0016414 A1). Solheim et al. further teaches in FIG. 2A, FIG. 3 and paragraph [0072] centralized network and element management system (NEMS) and centralized database. Therefore, it is obvious to have a centralized operating system for collecting information from all access nodes and build a centralized network database for managing the network.

Claim 166 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 161-163 and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1). Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly.

Claims 167-172 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Francisco et al. (M. Francisco et al., "End-To-End Signaling and Routing for Optical IP Networks", IEEE, 2002). Francisco et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Francisco et al. teaches in FIG. 5 to communicate with nodes on a selected path for path setup. Regarding claim 170, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time. Regarding claim 171, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set. Regarding claim 172, Francisco et al. teaches in p. 2872 Section C OBGP wavelength table where wavelength attributes are recorded.

Claims 173-178 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Francisco et al. (M. Francisco et al., "End-To-End Signaling and Routing for Optical IP Networks", IEEE, 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Francisco et al. teaches in FIG. 5 to communicate with nodes on a selected path for path setup. It is obvious to convert the method of Jukan et al. into a computer program and store the program in a machine-readable medium such as tape or disk. Regarding claim 176, Jukan et al. teaches in p. 827, right col., second paragraph that the method is for on-demand provisioning which implies real time. Regarding claim 177, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set. Regarding claim 178, Francisco et al. teaches in p. 2872 Section C OBGP wavelength table where wavelength attributes are recorded.

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Claims 179-185 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Francisco et al. (M. Francisco et al., "End-To-End Signaling and Routing for Optical IP Networks", IEEE, 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Francisco et al. teaches in FIG. 5 to communicate with nodes on a selected path for path setup. Regarding claim 180, Francisco et al. teaches in p. 2874 teardown of lightpath. It is also known in the art that link state change only propagate within autonomous system (AS). Regarding claim 182, Jukan et al. teaches to include initial path sequence in path information message. Regarding claim 183, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set. Regarding claim 184, Francisco et al. teaches in FIG. 5(a) source based scheme for path setup. Regarding claim 185, Jukan et al. teaches lightpaths.

Claim 186 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of RFC-791 (RFC-791, Internet Protocol, IETF, September 1981). RFC-791 teaches in p. 16, option number 7, record route, for keeping trace of nodes that have been visited.

Claims 187, 189-190, 192 and 194-195 lack an inventive step under PCT Article 33(3) as being obvious over Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002) in view of Francisco et al. (M. Francisco et al., "End-To-End Signaling and Routing for Optical IP Networks", IEEE, 2002). Jukan et al. teaches in page 831, right col. distributed discovery of wavelength paths (DWP). Francisco et al. teaches in FIG. 5 to communicate with nodes on a selected path for path setup. Regarding claim 189, Francisco et al. teaches in p. 2874 teardown of lightpath. It is also known in the art that link state change only propagate within AS. Regarding claim 192, Jukan et al. teaches in p. 828, left col., Definition 1 service-specific wavelength set.

Claim 188 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998). RFC-2328 further teaches in Section 12.2 link state database.

Claim 193 lacks an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the preceding paragraph with regard to claims 187, 189-190, 192 and 194-195 and further in view of RFC-791 (RFC-791, Internet Protocol, IETF, September 1981). RFC-791 teaches in p. 16, option number 7, record route, for keeping trace of nodes that have been visited.